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Access to healthcare is a continuing problem, particularly in rural America. The rising costs of care, the resistance of physician providers to enter primary care medicine or enter practice in isolated settings, the emphasis on curative rather than preventive medicine, restrictions by third party payers, and state practice laws are all factors influencing the access problem in rural America.

The providers of care in this country are not all physicians; many are classified as physician extenders. Physicians and physician extenders tend to choose employment in settings similar to the sites where they receive their clinical training. (Ballweg, 1991; Herman, 1991).

Physician Assistants (PA) are limited in the scope of their practice by state laws which restrict their functionality in healthcare delivery. These laws also impose access barriers by limiting PA availability in sites and facilities which also lack physicians.

The purpose of this study is to analyze the relationship between states' legislation for the Physician Assistant and prescribing authority, dispensing authority, satellite practice authority, and the presence of a PA school in the state.

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IN RURAL HEALTH PROFESSIONAL SHORTAGE AREAS

A Graduate Management Project
Submitted to the Faculty of
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In Partial Fulfillment of
the Requirements for the degree
of
Master of Health Administration
by
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TABLE OF CONTENTS

	PAGES
ACKNOWLEDGEMENTS	i
ABSTRACT	ii
CHAPTER	
I. INTRODUCTION	1
Statement of Management Problem	4
Literature Review	5
The History of Physician Assistants.	5
Federal Initiatives	10
State Authority	13
Private Practice	15
The Condon Experience	17
Purpose	20
II. METHODS AND PROCEDURES	21
III. RESULTS	27
IV. DISCUSSION	29
V. CONCLUSIONS AND RECOMMENDATIONS	32
VI. REFERENCES	38
VII. LIST OF TABLES	41

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Rural Health

ABSTRACT

Access to healthcare is a continuing problem, particularly in rural America. The rising costs of care, the resistance of physician providers to enter primary care medicine or enter practice in isolated settings, the emphasis on curative rather than preventive medicine, restrictions by third party payers, and state practice laws are all factors influencing the access problem in rural America.

The providers of care in this country are not all physicians; many are classified as physician extenders. Both physicians and physician extenders tend to choose employment in settings similar to the sites where they receive their clinical training. (Ballweg, 1991; Herman, 1991). This may indicate that states without education programs may be at an immediate disadvantage in the struggle to meet primary care health needs.

Physician Assistants (PA) are limited in the scope of their practice by state laws which restrict their functionality in healthcare delivery. These laws also impose access barriers by limiting PA availability in sites and facilities which also lack physicians.

The purpose of this study is to analyze the relationship between states' enabling legislation for one category of physician extender, the Physician Assistant (PA), and four independent variables; prescribing authority, dispensing authority, satellite practice authority, and the presence of a PA educational program (school) in the state. The dependent variable, proactivity, will be the degree of state health professional shortage areas (HPSAs). A model demonstrating the impact of enabling legislation for PA practice in meeting primary health care needs in a rural setting is provided. It is hoped that this example may assist states with severe rural health manpower shortages in developing a viable plan for meeting the primary care health needs of their communities.

INTRODUCTION

Dr. Lewis Sullivan, Secretary of Health and Human Services, (quoted in Department of Health and Human Services [DHHS], 1991c) wrote:

Medical care alone, will not eliminate the devastating impact of chronic disease on the disadvantaged, nor will it reduce, as much as we would like, the rate of infant mortality or the burden of homicide and violence or any of the other "health" problems that are borne by the poor in our society. . . . "prevention" . . . is an absolute necessity. . . . good health must be an equal opportunity, available to all Americans. (p. v)

Healthy People 2000 (DHHS, 1991c) has among its objectives for the nation, to "achieve access to preventive services for all Americans" (p. 43). The overriding goal for the nation is healthy lives that are creative and productive, contributing to a thriving nation. The goal of prevention is part of a comprehensive strategy that underscores the necessity of health-related behaviors, health promotion, and environmental improvements to enhance health.

Additionally, the objectives of Healthy People 2000 (DHHS, 1991c) focus on increasing the proportion of primary care providers who offer preventive services on a routine basis to their patients. The Department of Health and Human Services views preventive services as part of basic primary health care, yet steps toward increasing preventive services may be ineffective when the average state is experiencing a 61 percent shortage of primary care medical personnel.

The appropriateness of using PAs for primary intervention and, in particular, for patient education is supported in an Office of Technology Assessment (OTA, 1986) report, Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis, which reflects that PAs spend more time than physicians educating patients. Patient education is an integral component of health promotion and areas which are already lacking adequate primary care services place some groups at risk, such as the elderly, chronically ill, and those living in rural areas who might have to travel a great distance to see a physician, at a disadvantage. By 1990, the OTA reported that despite the overall increase in

physicians over the years, rural areas have fewer than one-half as many physicians providing patient care as urban areas (OTA, 1990). The American Academy of Physician Assistants' (AAPA) 1989 survey revealed that approximately 20% of the PA profession practices in rural areas (Journal of the American Academy of Physician Assistants, 1990).

Ermann (1990) characterizes the rural health care system as one which has difficulty attracting providers and which encompasses an aging population in need of medical care. Because PAs have improved access to care in settings where sufficient physician care is not always available or where physician care is above the level needed, such as community clinics, drug and alcohol abuse clinics, and prisons (OTA, 1986), logic would hold that the PA could help fill the rural health provider void. One of the primary goals of the PA profession when it was established was cost effective, primary care to underserved populations.

The question remains, however, whether or not the nation has effectively utilized this professional group. Specific questions such as: Is there a need to modify existing legislation to expand the scope of PA

practice, and what is the impact of state legislation on rural health access, demand answers.

This paper will explore these questions and address the relationship between states' legislation and the potential to enhance health care access in rural health professional shortage areas by utilizing PAs. The results of this study should provide valuable insight regarding factors influencing rural health care access. Strategies to enhance the provision of primary care medicine and facilitate the achievement of Healthy People 2000 (DHHS, 1991c) objectives are as creative as the imagination of the community leaders themselves.

STATEMENT OF MANAGEMENT PROBLEM

Access to healthcare continues to be a problem for rural Americans. If there is a relationship between state PA practice legislation and/or PA schools on HPSAs, can access to care in rural America be increased through legislative changes which facilitate health care delivery by PAs, or by establishing a PA education program?

LITERATURE REVIEW

The History of Physician Assistants

E. H. Estes, Jr., M.D. (quoted in Pitcairn & Flahault, 1974), cautions Americans regarding the frivolous use of healthcare resources. He holds that, as a nation, Americans believe that the best medical care is that which the highly trained specialist provides. However, Americans recognize also that medical resources have limits and need to be conserved. As a result, medical manpower substitutes for physician services, such as nurse practitioners (NPs), certified nurse-midwives (CNMs), certified registered nurse anesthetists (CRNAs), and physician assistants, were developed to allow for more effective utilization of physicians.

In the late 1960s, highly trained physician specialists were quickly absorbed by large cities, leaving gaps in rural health delivery systems. The farming communities which were well stocked with general practitioners until the end of World War II were in crisis. It was about this time that medical schools began to develop hospital trained physician

specialists. This phenomena created a cycle of dependence on other specialists, hospitals, and the technical equipment available in state-of-the-art healthcare facilities. The low numbers of physicians entering primary or rural practice, coupled with the costs of care and the continued demand, caused medical professionals to realize that there were no generally trained assistants available to doctors. There was, however, an immediate need. In response to this situation, Eugene Stead, M.D., developed the first physician assistant training program at Duke University in 1966 (Pitcairn & Flahault, 1974). As the chairman of the Department of Medicine at Duke University Medical Center, Durham, North Carolina, Dr. Stead actualized the idea of training former military corpsmen to be assistants to the physician.

The curriculum developed at Duke was a mirror of the medical school curriculum. Simply put, it was a collection of subjects which the physician faculty thought were important and wanted to teach. Present day programs incorporate knowledge and skills which are needed in PA practice, focusing on illnesses and injuries which PAs might be called upon to diagnose and

treat. Today 55 PA programs exist in 29 states throughout the country, awarding credentials in the form of Certificates, Associate, Baccalaureate, or Masters degrees. All three branches of the Armed Services have programs for active duty members. The greatest number of programs are located in the northeastern portion of the United States. This is the part of the country that is experiencing the smallest rural health personnel shortage.

Initial PA programs took second seat to the medical curriculum and sometimes were placed in the school of allied health. Since funding for PA programs was more restrictive, the programs became more cost effective, efficient systems (Pitcairn & Flahault, 1974).

At a talk given during the annual meeting of the Federation of State Medical Boards in 1988, Dr. Estes said:

We in medicine should be aware of other professions which have demanded higher and higher educational and professional levels of training while not meeting the needs of the sick and the underserved among us, and

society's desire for more reasonably priced services. If we are not careful, the PA may become the most valued professional on the medical scene (p.264).

Dr. Estes' statement is not intended to belittle the importance of our physician specialists but rather to encourage one to rethink the issue of basic care for basic needs.

The Office of Technology Assessment (1986) found that compared to physicians, PAs are more interested in locating to nonaffluent, medically underserved areas. Today, PAs work in general/family practice, pediatrics, obstetrics and gynecology, emergency medicine, occupational medicine, and other specialties (Schafft & Cawley, 1987). They are trained to perform tasks leading to diagnosis and are educated to carry out treatment indicated by the condition diagnosed. It is estimated that 60%-80% of the tasks normally performed by primary care physicians can be provided by PAs and NPs without consultation. Of these tasks, 90% of pediatric care provided in primary care settings can be provided by PAs and NPs. In total, 50-75% of all primary services can be provided by physician extenders

(OTA, 1986). A Graduate Medical Education National Advisory Committee (GMENAC) study of general practice outpatient visits concluded that PAs could be substituted for physicians at a ratio of 0.5:1 to 0.75:1 when the number of patients was used as the output measure. Since the average annual salary for a PA in Family or General Practice medicine is approximately 36% of a physician's salary in the same specialty, PA efficiency is worthy of consideration in the provision of high quality primary medical care (Sturmann, Ehrenberg, & Salzberg, 1990).

PAs function under the authority and responsibility of a supervising physician, while the physician retains the responsibility for care delivered by a PA working under his/her direction and medical license. PAs take histories, perform physical examinations, order and interpret diagnostic tests, and manage many common health problems (Sturmann, Ehrenberg, & Salzberg, 1990).

In all but five states PAs are required to sit for a national certification examination developed by the National Board of Medical Examiners (N. Gara, personal communication, 2 April, 1992). Successful mastery of

this examination, 100 hours of continuing medical education credits every two years, and mandatory recertification examination every six years are required for PA certification. PAs are one of four health professions with a self-regulatory system involving periodic mandatory recertification examination (Journal of the American Academy of Physician Assistants, 1991).

Federal Initiatives

In 1970 the National Health Service Corps (NHSC) was established with the intent of providing health personnel to designated health manpower shortage areas by linking scholarship to service obligation. It was not until 1991, however, that PA students were eligible to apply for NHSC scholarships. In 1977 Congress passed the Rural Health Clinic Services Act, which authorized Medicare and Medicaid to pay for primary health care provided by PAs and NPs staffing certified clinics in rural underserved areas. (Journal of the American Academy of Physician Assistants, 1990). This same year, the United States Department of Health, Education, and Welfare, Report of the Physician Extender Workgroup, stated that the Federal Government

subsidized PA and physician training programs with emphasis on primary care. In fact, Federal Government training expenditures expanded from less than \$1 million in 1969 to more than \$21 million in 1979 for PA and NP training (Armstrong, 1991).

The intent was to increase access to primary care in areas of need. However, in 1980 federal initiatives slowed to almost a dead stop with the publication of a report from the GMENAC. This report projected a surplus of physicians by 1990 and suggested reducing federal health manpower initiatives. In the wake of the rush to reallocate federal funds, a deaf ear was turned to warnings that primary care physicians would still be needed; maldistribution problems would still exist especially in rural areas, and PA educational programs should continue to be supported at current federal funding levels (Journal of the American Academy of Physician Assistants, 1990).

The 1980s market forces pushed physicians into larger rural communities but the remote, poorer communities still lacked minimal health care. The Federal Government recognized the significance of the problem and The Office of Rural Health Policy (ORHP)

was established within the Health Resources and Services Administration (HRSA) of the Department of Health and Human Services (DHHS) in 1987. This office exists to work with other Federal agencies, states, national associations, foundations, and private sector organizations to seek solutions to health care problems in rural communities. In 1991 the Office of Shortage Designation, Bureau of Health Care Delivery and Assistance, HRSA, designated 2,082 Health Professional Shortage Areas. Of these, 627 were metropolitan and 1,455 were non-metropolitan (Selected Statistics on Health Professional Shortage Areas, 1991). This designation represents an estimated unserved population of 13,024,996 and a need for 4,408 practitioners. To make matters worse, it is projected that as many as 25% of rural physicians may retire or leave their communities by 1993. (Journal of the American Academy of Physician Assistants, 1990).

Despite the opportunity to seek assistance, many rural health clinics have never submitted applications to be certified under the Rural Health Clinic Services Act. In 1980 a number of government agencies reviewed possible causes for this problem and among those cited

was, "state laws governing PA and NP utilization were too restrictive" (*Journal of the American Academy of Physician Assistants*, 1990, p. 417). Other obstacles included inadequate marketing of the program, complex and time consuming reports and surveys, a lengthy certification process, and state personnel who applied criteria too stringently to meet certification requirements (*Journal of the American Academy of Physician Assistants*, 1990).

State Authority

The principle legal mechanism for regulating the qualifications and performance of health personnel, licensure, is a function of state government (Roemer, 1980). Regulation also includes actions which affect access to care through attempts to equitably distribute resources by developing systems which organize and finance health care.

The state exercises licensure authority under its police power in an attempt to protect the health, safety, and welfare of its people. Under this power the state legislature may determine the need and type of licensure law and regulation (Roemer, 1980). Accordingly, "requirements pertaining to registration

and certification, as well as prescriptive privileges, vary according to state regulations" (Sturmann, Ehrenberg, & Salzberg, 1990, p. 304). State laws require PAs to be licensed and the license allows PAs to practice under a supervising physician. Physician licensure allows physicians unlimited ability to perform all functions of diagnosis and treatment of patients, including functions which other allied health personnel may be licensed to perform. This all-inclusive scope of practice accounts for the delegation of functions to PAs (Roemer, 1980). The dependent function of PA practice is less restrictive and less rigid than an independent function which would require states to specify and describe in great detail the tasks which the PA would perform (Pitcairn & Flahault, 1974). The collegial relationship between physician and PA dictates the flexibility and freedom of practice within the license of the employing physician.

State regulated payment programs may affect the qualifications of personnel, the ways in which they work, or patterns of practice (Roemer, 1980). Their intent is to maintain a level of quality in the care delivered. With the 1977 Rural Health Clinic Services

(RHSC) Act, payment for physician services provided by NPs and PAs were authorized under Medicare and Medicaid in rural health clinics in an effort to promote primary care delivery. Reimbursement policies affect the retention and utilization of providers in all areas of the country. Medicare coverage and reimbursement are particularly important for rural providers because of the large proportion of elderly living in rural areas. Newsweek reported that reimbursement for services other than those provided in approved rural health clinics can be up to 30% lower in rural areas (Maier, 1989). One significant issue with the Medicaid program is that in some situations it is in direct conflict with state PA practice laws. For example, Kentucky has satellite practice legislation and yet, Medicaid reimbursement for PA services requires physician supervision on site.

Private Practice

The literature suggests that the employment of physician assistants varies with the type of care delivery system and yet reflects the strengths of the profession.

Large group and staff-model Health Maintenance

Organizations [HMOs] usually provide care at primary HMO sites and employ NPs, PAs, and CNMs because they are costsaving and because they provide health education and preventive services that meet standard levels of quality. The IPA [individual practice association] model is less likely than other models to employ these practitioners, because the "plan is primarily organized around solo/single specialty group practices," which do not benefit as much from employing and using NPs, PAs, and CNMs as do larger group practices (OTA, 1986, p. 63).

The Office of Technology Assessment (1986) reports that, because physicians established the PA profession, they tend to support and have confidence in the ability of these professionals. This would imply they are willing to precept them in a variety of settings, yet the potential to increase access through PA utilization is confounded by the fact that all private insurers do not cover physician services provided by PAs.

The Condon Experience

The story of Gilliam County Medical Center in Condon, Oregon may serve to illustrate how physician extenders can fill a need for rural primary care in a state which is also without a PA education program. In addition the Gilliam County experience provides a framework for looking at special measures which are needed to ensure the program is successful and sustaining.

The Gilliam County community of Condon with a modest population of 750 is located approximately 135 miles east of Portland and over 70 miles from the closest full service hospital. Condon is an incorporated town averaging 1.5 people per square mile whose economy is primarily farming based. The population has been decreasing since the closure of an Air Force base some years back, yet the elderly contingent has remained stable. The residents are in generally good health with a relatively high per capita income and a high proportion of adults with high school educations. Special health care concerns focused on infant mortality and chronic disease, particularly pulmonary and cardiac disease.

For a number of years in the late 1970s, Condon unsuccessfully searched for a doctor. Up to that time Condon had physician sharing arrangements with other counties, except for a brief three year period when services were provided by a National Health Service Corps recipient. When the Condon Health Committee and the Oregon Office of Rural Health (ORH), created in 1980, were faced with the inability to recruit and retain physician providers, the decision to hire another level of provider was made. The recruitment of physician extenders proved to be a superb decision for this community.

Success at the Condon clinic was the result of a multi-faceted effort. The ORH provided support in directing interested practitioners to the site, awarding small grants, and providing technical assistance. The local Emergency Medical Services (EMS) worked with the clinic as did local dentists and mental health workers. A 1979 state law which allowed PAs to practice in satellite locations, with minimal supervision was essential since the supervising physician for the two PAs working in the clinic is located 90 miles away. This practice in Oregon is

contingent upon the PA being located in a state-designated medically disadvantaged area and having established mechanisms for communicating with the supervising physician and engaging in regular on-site review. In addition, the PAs are allowed to prescribe and dispense pharmaceuticals from a list approved by the State Board of Medical Examiners.

The Condon Health Committee was instrumental in creating a health tax district to subsidize a Primary Care Medical Center. The subsidy was intended to support the two PAs needed to provide 24 hour health care coverage. It also insulated the Medical Center from county and town politics. The health district, similar to a tax district or school district, was created when the Community members obtained a petition and created the health district without a general election. Property taxes in the amount of \$1.11 per \$1,000 value are assessed to support the Medicare-certified rural health clinic. An independent contract between the health district and a lead supervising physician allows the subsidy to be transferred monthly as a flat fee to the clinic. The health district owns the for-profit clinic and profits are split between the

health district and the providers. The clinic has been so successful that the tax subsidy has gone from 50 percent to 33 percent of the annual clinic budget (OTA, 1990).

Although the Condon experience provides encouragement for other rural communities, perseverance and determination were essential. Obtaining Medicare certification was cited as the greatest resource drainer in the start-up operations. And even with this project running smoothly, in 1986, the Rural Health Coordinating Council and the Oregon Association of Hospitals cited recruitment and retention of primary care providers as the number one problem in rural areas (OTA, 1990). As of 1991, Oregon was experiencing an 89% statewide primary medical health personnel shortage; 75% of the counties experiencing a shortage were rural (DHHS, 1991a).

PURPOSE

The purpose of this study is to analyze the relationship between states' legislation regarding PA practice and rural health professional (primary care medical) shortage area (HPSA) severity. Four hypotheses will be tested:

Ha 1: There is a relationship between state prescribing authority for PAs and HPSAs.

Null: There is no relationship between state prescribing authority for PAs and HPSAs.

Ha 2: There is a relationship between state dispensing authority for PAs and HPSAs.

Null: There is no relationship between state prescribing authority for PAs and HPSAs.

Ha 3: There is a relationship between legislation which allows PA satellite practice for PAs and HPSAs.

Null: There is no relationship between legislation which allows PA satellite practice and HPSAs.

Ha 4: There is a relationship between states with PA schools and HPSAs.

Null: There is no relationship between states with PA schools and HPSAs.

METHODS AND PROCEDURES

The Public Health Service Act requires the Secretary, Department of Health and Human Services, to establish criteria for designation of health professional shortage areas (DHHS, 197). These criteria include the designation of seven types of

health manpower shortage areas: primary medical, dental, psychiatric, vision, podiatric, pharmacy, and veterinary care. Primary care medical shortage refers to physician providers in general practice and the specialties of Family Practice, Internal Medicine, Pediatrics, and Obstetrics-Gynecology (M. Gaunaurd, personal communication, January 24, 1992, HHS). For these seven types of manpower shortage areas, criteria for the designation of geographic areas are defined and a degree of shortage is assigned. The criteria for the Primary Medical Care Manpower category are as follows:

1. The area is a rational area for the delivery of primary medical care services.
2. One of the following conditions prevails within the area:
 - (a) The area has a population-to-full-time equivalent primary care physician ratio of at least 3,500:1.
 - (b) The area has a population-to-full-time equivalent primary care physician ratio of less than 3,500:1 but greater than 3,000:1 and has unusually high needs for primary care services or insufficient capacity of existing

primary care providers.

3. Primary medical care manpower in contiguous areas are overutilized, excessively distant, or inaccessible to the population of the area under consideration (DHHS, 1980, p. 76001).

Referred to as Health Professional Shortage Areas, (HPSAs), these designations include (1) urban and rural geographic areas, (2) population groups, and (3) facilities with shortages of health professionals. The list, published annually, reflects newly designated areas and revisions to previous lists which may delete designations which have experienced a change and therefore no longer meet the criteria.

Published in the Federal Register, the list of primary medical care HPSAs are arranged by state and presented by county within each state. In addition, the Federal Register designates counties as non-metropolitan i.e., rural, with an asterisk (*). For each county, the portion or portions of the county (service areas) affected have also been designated. For purposes of this study, counties which were designated as either totally or partially underserved, were counted as a short county. The Bureau of the

Census provided the number of counties per state.

Utilizing data obtained from the September 27, 1991 Federal Register and the Bureau of the Census, Department of Commerce, two data sets were built. For the first set, the sample consisted of 51 cases -- 50 states and the District of Columbia. The researcher computed the percentage of each state which was designated a HPSA for Primary Medical Care by dividing the number of short counties by the total number of counties and multiplying by 100. The data elements, or events, were then coded in binary fashion for proactivity (dependent variable) with respect to the mean of 61 percent. States that fell below the mean were coded 1, those above the mean were coded 0. Proactivity is defined as the quality attached to the event that a state has a shortage below the mean which might reflect action taken in anticipation of problems or needs.

The American Academy of Physicians Assistants publications, "Prescribing and Dispensing" and "Excerpts From State Laws and Regulations Regarding Utilization And Supervision of Physician Assistants in Satellite Offices", provided data for prescribing,

dispensing, and satellite practice variables. Prescribing privileges in some states were restricted to Board formularies or proposed formularies and in some cases states placed restrictions on prescribing controlled substances such as certain schedules of drugs. For purposes of this study if states allowed PAs to prescribe, the data was coded 1, 0 if otherwise. Similarly, states which allowed dispensing but placed some restrictions were coded 1, 0 if otherwise. Satellite practice was coded 1 only if states had written language addressing this issue, 0 if otherwise. Physician Assistant Programs Directory provided data for the existence of schools by state. If a school exists in the state it was coded 1; code 0 if otherwise. The data set did not account for the number of schools in a state nor did it account for military training programs.

The data sets were built using a MICROSTAT software package loaded into a Zenith computer. First, for each state, the percentage of total counties designated short by HRSA was entered and the other properties of proactivity (dependent variable), prescribing, dispensing, school, and satellite practice

(independent variables) were coded in binary fashion. In each case, 1 indicated the property was present, 0 if otherwise. This created 51 rows with 6 columns. This method of building a data set was carried out for each state and the District of Columbia thereby accounting for 51 cases. For the second data set, the researcher computed the percentage of rural counties(*) that comprised the total county shortage by state. Proactivity was coded with respect to the new mean of 64. Proactive states were defined as those below 64. Because the researcher used binary data, the principles of validity and reliability are more simply addressed than in studies using more complicated instruments. Assigning numbers to a property in a case is simply a matter of assigning 1 if yes and 0 if otherwise. Emory states that nominal data scales are frequently used in social sciences and business research, and in particular in exploratory work that seeks to uncover relationships. In this case, the researcher is seeking to uncover relationships which exist between the independent variables and the interest variable, proactivity.

Stepwise regression analysis was performed on both

data sets. This allowed the researcher to determine the impact of the independent variables upon the dependent variable by identifying the significant variables immediately and discarding those variables which are not statistically significant.

DESCRIPTIVE STATISTICS FOR PROACTIVITY

	N	MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM
STATEWIDE ANALYSIS (SHORT COUNTIES/ TOTAL COUNTIES)	51	61.0000	20.1057	20	100
RURAL COUNTY ANALYSIS (SHORT RURAL COUNTIES TOTAL SHORT COUNTIES)	51	64.0196	28.6458	0	93

Table 1

RESULTS

Data Set Number One: State Wide Analysis

The data set consisted of 51 cases (N) with a mean of 61.0000 and a standard deviation of 20.1057. (Table

1) This means that throughout the fifty states and the District of Columbia, 61% of all counties are designated HPSAs. The first step in the analysis yielded an R squared of .0974, $p = .0252$ for the variable, school. With a regression coefficient of .3106, the relationship is positive, meaning that the variable, school, is statistically significant in this study. The second step in the analysis yielded an R squared of .1898, $p < .01$ for the variable, dispensing. The regression coefficient in this case is -.3141. (Table 2) The negative coefficient indicates that dispensing correlates negatively with HPSAs, or that states with dispensing legislation are more likely to have 61% or more of their counties designated as HPSAs.

Data Set Number Two: Rural County Analysis

The data set again consisted of 51 cases (N), with a mean of 64.0196, and a standard deviation of 29.6458. (Table 1) This means that throughout the 50 states and the District of Columbia, 64% of all HPSAs are rural. Stepwise regression analysis was performed. This analysis of rural county shortage yielded an R squared of .3161, $p < .001$ for the variable, satellite. With a regression coefficient of -.5172, the relationship of

satellite practice legislation to rural HPSAs is inverse also. (Table 2) States which have more than 64% of their HPSAs in rural areas are more likely to have satellite practice legislation. The variable prescribing was not found to be statistically significant.

STEPWISE REGRESSIONAL ANALYSIS

VARIABLE	REGRESSION COEFFICIENT	df	R2	P
STATEWIDE ANALYSIS				
STEP 1	SATELLITE	-0.5172	1, 49	0.3161 0.001
RURAL COUNTY ANALYSIS				
STEP 1	SCHOOL	0.3106	1, 49	0.0974 0.05
STEP 2	DISPENSE	-0.3141	1, 48	0.1898 0.05

Table 2

DISCUSSION

The analysis of data set number one, reflecting a state wide picture, demonstrates that the average state

is experiencing a 61 percent shortage of primary medical care providers. The standard deviation of 21.1057 provides information regarding the range of the problem. Since 95 percent of the sample falls within two standard deviations of the mean, 95 percent of our states, or 48 states, are experiencing a primary care medical shortage of between 20 (Hawaii) and 100 (District of Columbia) percent. The regression analysis R squared, .0974, indicates that about 10 percent of the variance between states which are proactive and those which are not is attributable to the presence of a PA education program. The p of .0258 indicates that this relationship occurs less than 3 percent of the time due to chance alone, or that if the study was repeated 100 times, a statistic this large or larger would occur by chance three times of the 100 trials. It also means there is a 3% risk that the researcher is incorrect in saying that the relationship is statistically significant. The regression coefficient of .3106 indicates that the effect is weakly positive. In other words, states that have PA schools are less likely to have primary medical care HPSAs. Accordingly, the researcher is able to accept

the fourth hypothesis; there is a relationship between HPSAs and states which have PA education programs.

Regression analysis step 2 demonstrated that the variable, dispensing, increases the R squared to .1898 at the .05 level of significance. That means that dispensing accounts for almost 19 percent of the variation between states which are proactive and those which are not. This effect occurs less than five percent of the time due to chance alone. The variable, dispensing, does however, have a negative effect on proactivity; states which are proactive (less than 61% of the counties are designated HPSAs) are less likely to have dispensing legislation. The researcher then accepts Hypothesis two: there is a relationship between HPSAs and states which have dispensing authority.

The Rural County Analysis demonstrates that on the average, 64 percent (mean = 64.0196) of a state's short counties are rural. With a standard deviation of 28.6458, this may range from 0 to 93 percent (Wisconsin). Six states identified only non-rural counties as short; Connecticut, Delaware, the District of Columbia, Hawaii, Rhode Island, and New Jersey. All of these states have rural counties except the District

of Columbia.

Stepwise regression yielded an R squared of .3161, $p < .01$ for the variable, satellite. This means that almost 32 percent of the variance between rural states which are proactive and those that are not is accounted for by the variable, satellite. With a regression coefficient of -.5172, the relationship is negative, meaning that states which are proactive (less than 64 percent short) are less likely to have satellite practice legislation than those which are not. The researcher then is able to accept Hypothesis 3: there is a relationship between HPSAs and states which have satellite practice legislation. The variable, prescribing, was not found to be statistically significant. The researcher therefore accepts the null hypothesis 1: there is no statistically significant relationship between state prescribing authority and HPSAs.

CONCLUSIONS AND RECOMMENDATIONS

The positive relationship which exists on the national level between schools and proactivity as defined in this paper is not a surprising one.

Graduate PAs may remain in the state where they trained

and even though the HPSA designation is determined by a physician:population ratio, the impact of PA practice in some states may have indirectly impacted HPSA designation, although this factor has not been measured nor factored into the equation. Through the provision of primary care services in a wide variety of settings, PAs are providing needed access where physicians may not exist. Since the request for HPSA designation originates locally, communities may have met provider needs through non-physician manpower and intentionally avoided seeking HPSA designation.

The inverse relationship which the researcher found between proactivity and dispensing legislation may mean that the services for dispensing pharmaceuticals may already be available within communities. This may be in the form of local druggists or pharmacies based in food or discount chain stores. Although health care services might be lacking in some counties, druggists and chain stores may be readily available in these counties which are not rural and are designated HPSAs because of their medical care needs.

The finding of no statistical significance by the

researcher for the variable, prescribing, may be accounted for by the fact that HPSAs are designated by a physician:population ratio. States (counties) which are short of physicians are not impacted by PA prescribing legislation since PAs are not factored into the designation.

The rural county HPSA finding for satellite practice is not surprising. The proactive states (less than 64% of the total counties short are rural) are less likely to have satellite practice legislation. Based on the definition of proactivity used in this study, their need for satellite practice legislation might be less than other states. An example of this might be Massachusetts. With 14 total counties, 8 are designated HPSAs (57% county shortage). Of these 8, one is rural (12% rural shortage). Massachusetts does not have satellite practice legislation because a need for satellite practice authority may not be seen as representative of the needs of the state. When we acknowledge that satellite practice authority is a means to access the health care system through establishing providers in remote or isolated communities, it serves to explain these findings.

The issue of access to primary care medicine in rural America continues to be a dilemma. The answer to alleviating rural primary care medical personnel shortages may not rest in state legislation for PA practice parameters, and yet this study serves to explore some of the relationships between state legislation and primary care medical personnel shortages.

The lack of primary care medical personnel in rural communities is part of a continuum; physician provider shortages provide the basis from which all health care support is coordinated. The relationships which exist between all aspects of the health care delivery system are not easily dissected and yet these relationships impact this study.

Satellite practice authority in some states may only serve to facilitate non-primary care medical delivery. This extended practice authority may not be enough to lure PAs into rural primary care medicine for the same reasons that physicians are reluctant to enter rural health care.

Clearly, health care is a local issue. The Condon experience provides a framework for approaching medical

personnel shortages in rural states which have no PA education program.

Presently there are a number of Federal initiatives which are designed to bring primary health care providers into rural areas. The Rural Health Clinic Services Act and the National Health Service Corps are two such programs. However, to date the impact of these programs on resolving access to care in rural America is minimal. New or modified initiatives are needed. Recommendations for states include:

- (1) Federal/state governments should provide tax-credits for Physicians and PAs working in HPSAs.
- (2) State governments should provide PA scholarships with an incurred obligation, targeted at rural residents/students.
- (3) States should pursue opportunities for PA practice in satellite settings via telecommunication/computer assisted treatment systems.
- (4) States should consider a network approach to resolving the HPSAs. This might include contracting with a number of physicians to precept PAs in satellite settings, while the physician maintains a non-rural residence or practice.

- (5) The Federal Government should work to smooth the application process for clinics seeking to be designated a Rural Health Clinic.
- (6) States should consider licensure restrictions for PAs who seek to work in specialty practices which are not recognized as a primary care shortage.
- (7) The Federal Government should review the accuracy of HPSA designation; by including non-physician providers in the equation, the impact of these groups on alleviating shortages might serve to demonstrate their significance in the provision of health care.
- (8) States should seek to reconcile conflicting policy such as PA practice laws which conflict with state Medicaid program policies.

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LIST OF TABLES

TABLE	PAGES
1. DESCRIPTIVE STATISTICS FOR PROACTIVITY ...	27
2. STEPWISE REGRESSIONAL ANALYSIS	29